

GUIDE TO THE GENERA OF LIANAS AND CLIMBING PLANTS IN THE NEOTROPICS

CAMPANULACEAE

By Mark T. Strong (Aug 2021)



Lobelia rotundifolia, photo by P. Acevedo

A widely distributed family of herbs, shrubs, and vines, rarely trees, with about 90 genera and ca. 2,415 species worldwide. In the Neotropics, there are about 17 genera and ca. 1,360 species with 4 genera and 72 species in subfamily Lobelioideae recorded as lianas or climbers, all of which are endemic to the Neotropics.

Diagnostics: In vegetative condition, climbing or scandent Campanulaceae have stems that are terete to quadrangular in cross section and often have milky sap; pubescence of dendritic, septate or simple trichomes or lacking; leaves are alternate, rarely opposite, simple or sometimes lobed or parted, petiolate or sessile, often with toothed margins, the teeth often callous-tipped; stipules absent.

GENERAL CHARACTERS

1. STEMS. Mostly herbaceous, terete to quadrangular in cross section.
2. PUBESCENCE. Lacking or herbage finely pubescent, appressed-pubescent, or scabrid; trichomes dendritic (arbusculiform), septate or simple.
3. EXUDATES. Commonly with white milky sap.
4. CLIMBING MECHANISMS. All neotropical climbing Campanulaceae are scrambling herbs or subshrubs.
5. LEAVES. Alternate, rarely opposite or whorled, simple, the blades ovate, elliptic, or lanceolate, with pinnate, craspedodromous or camptodromous venation, the margins entire or variously toothed, the teeth often with callous tips; stipules absent.
6. INFLORESCENCES. Solitary, axillary flowers or terminal, bracteate or foliose racemes.
7. FLOWERS. Flowers resupinate, bisexual, often pedicellate, the pedicels bibracteolate or ebracteolate; calyx forming a hypanthium, 5-lobed, synsepalous; corolla 5-lobed, gamopetalous, zygomorphic, bilabiate, often with 2 dorsal and 3 often larger ventral lobes, the tube entire or in *Lobelia*, cleft or sometimes fenestrate; stamens 5, epigynous, alternate corolla lobes, included, rarely exserted, the filaments fused basally, often forming a tube which is free, adnate to corolla tube at base, or attached at apex of hypanthium; anthers connate; ovary inferior, 2-locular, the placentation axial, rarely parietal or apical, often with an annular nectary at apex; style solitary, pubescent proximally, the stigma 2-lobed.
8. FRUITS. Juicy or dry indehiscent berry or a two-valved capsule with apically loculicidal or laterally poricidal dehiscence and numerous small seeds with copious endosperm.

USES

The showy flowers of many Campanulaceae are cultivated as ornamentals in the gardening trade. Several others have been grown as vegetables in Europe and Asia for their edible young leaves and roots. The pyridine alkaloid, lobeline, extracted from *Lobelia inflata*, has been used to treat respiratory conditions. The roots of *Codonopsis pilosula* have been used in traditional Chinese medicine as a tonic for weakness, fatigue, loss of appetite, and as a substitute for ginseng. It has also been shown from research to improve digestion and strengthen the

immune system. Extracts from the roots of *Platycodon grandiflorus* are the source of the Asian drug jie-geng or kikyō and used to treat coughs. Other species in the family not known to be exploited commercially, have been used in traditional folk medicine primarily in the Old World and to a lesser extent in the Neotropics.

KEY TO THE GENERA

- 1. Ovary with a conical apex; fruit a 2-valved, dehiscent capsule, the calyx lobes persistent at or near the middle at maturity.....2
- 1. Ovary with a flat or convex apex; fruit indehiscent, a fleshy or dry berry, the calyx lobes persistent at or close to apex at maturity3
- 2. Corolla tube cleft to base or fenestrate dorsally.....*Lobelia*
- 2. Corolla tube entire dorsally..... *Siphocampylus*
- 3. Corolla green or yellowish suffused with purple or maroon; pedicels ebracteolate; anther tube orifice open, the dorsal anthers straight; filaments attached at apex of hypanthium; seeds oblong to linear, much longer than broad, elongate-reticulate.....*Burmeistera*
- 3. Corolla brightly colored red, orange, or purple, rarely green or yellow; pedicels bibracteolate; anther tube orifice closed by three downcurved dorsal anthers; filaments attached at base of corolla tube; seeds ellipsoid, only slightly longer than broad, isodiametric-reticulate
.....*Centropogon*

GENERIC DESCRIPTIONS

BURMEISTERA H. Karsten & Triana, *Linnaea* 28: 444. 1857.



Burmeistera sp., photo by Carmen Galdames

Suffrutescent herbs or shrubs, sometimes scramblers; stems herbaceous, producing white sap; climbing species reaching 2 to 6 m in length. Leaves alternate, denticulate. Inflorescence of solitary, axillary flowers, rarely a terminal raceme or corymb; pedicels ebracteolate. Calyx generally with free lobes; corolla bilabiate, green or yellow, often suffused with purple or maroon, the tube entire, often inflated at base and/or mouth with dimorphic lobes, the two dorsal ones larger and often falcate; anther tube orifice open, the dorsal anthers straight; filaments connate, attached at apex of hypanthium; ovary flat at apex; style jointed near base, caducous with withered corolla and staminal column from fruit apex. Fruit a berry, sometimes much inflated; seeds oblong to linear, much longer than broad, the surface elongate-reticulate.

Unique features: The combination of green or yellow corollas suffused with purple or maroon, an open anther tube orifice, entire corolla tube, and oblong to linear seeds with elongate-reticulate surface distinguish this genus from the other genera of Campanulaceae treated here.

Distribution: A Neotropical genus of 125 species distributed from Central America south to Venezuela, Colombia, Ecuador, and Peru, of which 10 species are recorded as climbers, one occurring in cloud and montane forests of Panama from 1250-2450 m and the remainder in cloud and montane forest of the Andes from 900-3200 m.

CENTROPOGON C. Presl, Prodr. Monogr. Lobel. 48. 1836.

Suffrutescent herbs or shrubs, sometimes scrambling vines, often with white milky sap. Leaves alternate, often denticulate or serrulate. Inflorescence of solitary, axillary flowers, rarely



C. costaricae., photo by James Ojascastro

a terminal raceme or corymb; pedicels bibracteolate; calyx generally with free lobes; corolla bilabiate or tubular, often brightly colored red, orange, pink, or purple, rarely yellow, green or white, the tube entire, often constricted at base and/or inflated at mouth with dimorphic lobes, the two dorsal ones larger and often falcate; anther tube orifice closed by three downcurved dorsal anthers, the ventral ones with apical tufts of stiff or weak hairs; filaments attached at base of corolla tube; ovary flat at apex; style not jointed, persistent with withered corolla and staminal column on developing fruit. Fruit a berry, sometimes inflated; seeds ellipsoid, only slightly longer than broad, the surface isodiametric-reticulate.

Unique features: The combination of an entire corolla tube, indehiscent fruit, and ellipsoid seeds with an isodiametric-reticulate surface distinguishes this genus from the other genera of Campanulaceae treated here.

Distribution: A Neotropical genus of 213 species distributed from Mexico, Central America, Lesser Antilles, and South America, of which 21 species are recorded as climbers with one occurring in cloud forest and montane forest of Central America, 1100-3500 m, and the remainder in cloud forest, montane forest, disturbed forest, ravines, and secondary vegetation along roadsides of the Andes from (200-) 600-3500 (-3900) m.

LOBELIA Plumier ex Linnaeus, Sp. Pl.: 929. 1753.



L. rotundifolia, photo by P. Acevedo

Annual or perennial herbs, shrubs, sometimes trees or giant rosette plants, and rarely scrambling herbs or shrubs; stems herbaceous or subwoody, with abundant white sap. Leaves alternate, simple, rarely lobed or parted, the margins variously toothed or

entire. Inflorescence of solitary, axillary flowers, or a terminal raceme or panicle. Flowers pedicellate; calyx generally with free lobes; corolla unilabiate or bilabiate, blue or purple, less often red, orange, pink, green, yellow or white, the tube dorsally cleft to base, sometimes fenestrate, the lobes often dimorphic, the ventral ones larger. Stamens inserted on rim of hypanthium or at base of corolla tube, connate distally and forming an often exerted staminal

column; ventral or all five anthers often with apical tufts of stiff hairs, rarely all glabrous; ovary conical, completely or partially inferior. Fruit a loculicidal capsule, dehiscent apically by 2 valves, the calyx lobes persistent at or near the middle at maturity; seeds numerous, small, terete, trigonous, or lenticular, the surface reticulate or striate.

Unique features: The cleft or fenestrate corolla tube distinguishes this genus from the other genera of Campanulaceae treated here.

Distribution: A Cosmopolitan genus of 442 species with only *Lobelia rotundifolia* Juss. ex DC., endemic to the Caribbean (Hispaniola and Puerto Rico), recorded as a scandent or scrambling shrub in Hispaniola. This Greater Antilles endemic often occurs on limestone substrate in cloud forest, broad leaf forest, pine woodlands, ravines, mossy banks, and thickets from 1100-3125 m.

SIPHOCAMPYLUS Pohl, Pl. Bras. Icon. Descr. 2: 104. 1831.

Suffrutescent herbs or shrubs, sometimes scandent or twining lianas. Leaves alternate,



S. scandens, photo by Dick Culbert

rarely opposite or whorled, entire, rarely lobed or lacinate, often denticulate or serrate,. Inflorescence of solitary, axillary flowers, rarely a terminal raceme or corymb. Flower pedicels

bibracteolate, often

subtended by leafy or reduced bracts; Calyx lobes free; corolla bilabiate or tubular, red, orange, pink, or purple, less often yellow, green or white, the tube entire with dimorphic lobes, the dorsal ones generally larger; filaments of staminal tube free near base, adnate to corolla basally or rarely free, the ventral anthers with apical tufts of stiff white hairs, rarely glabrous; ovary conical

at apex. Fruit a loculicidal capsule, apically dehiscent by 2 valves, the calyx lobes persistent at or near the middle at maturity; seeds slightly longer than wide, reticulate.

Unique features: The combination of an entire corolla tube and capsular fruit distinguishes this genus from the other genera of Campanulaceae treated here.

Distribution: A Neotropical genus of 238 species distributed from Costa Rica, Panama, Greater Antilles, and South America, of which 40 species are recorded as climbers that are most diverse in cloud forest and montane forest of the Andes from 1200-3500 m.

RELEVANT LITERATURE

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